CLAIMS

1. A speech and music signal coder for producing a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal which is provided by adding a first excitation signal in correspondence with a first band of an input signal and a second excitation signal in correspondence with a second band of the input signal, said linear prediction synthesis filter setting with a linear prediction coefficient calculated on the basis of said input signal, said speech and music signal coder comprising: reproduction signal generating means for reproducing a first reproduction signal by driving the linear prediction synthesis filter in response to the excitation signal in correspondence with the first band; residual signal generating means for generating a residual signal by driving a linear prediction inverse filter in response to a differential signal indicative of a difference between the input signal and the first reproduction signal and; coding means for coding a component in correspondence with the second band in the residual signal after orthogonal transformation of the component.

2. A speech and music signal coder for producing a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal which is provided by adding 3 pieces of excitation signals in correspondence with 3 pieces of bands, said speech and music signal coder comprising, said linear prediction synthesis filter setting with a linear prediction coefficient calculated on the basis of said input signal, said speech and music signal coder comprising: reproduction signal generating means for generating a first and a second reproduction signal by driving the linear prediction synthesis filter in response to the excitation signals in correspondence with a first one and a second one of the bands; and coding means for generating a

residual signal by driving *a* linear prediction inverse filter in response to a differential signal indicative of *a* difference between an added signal produced by adding the first and the second reproduction signals and the input signal and for coding a component in correspondence with a third one of the bands in the residual signal after orthogonal transformation of the component.

3. A speech and music signal coder for producing a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal which is provided by adding N pieces of excitation signals in correspondence with N (~~N designates a natural number of 2 or larger~~) pieces of bands, said speech and music signal coder comprising: reproduction signal generating means for generating a first through an (N-1)-th reproduction signal by driving the linear prediction synthesis filter in response to the excitation signals in correspondence with a first through an (N-1)-th band; and N-th coding means for generating a residual signal by driving a linear prediction inverse filter in response to a differential signal indicative of difference between a signal produced by adding the first through the (N-1)-th reproduction signals and the input signal and for coding a component in correspondence with an N-th band in the residual signal after orthogonal transformation of the component.

4. A speech and music signal coder for producing a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal which is provided by adding 2 pieces of excitation signals in correspondence with 2 pieces of bands, said speech and music signal coder comprising: means for calculating a difference of a first coded decoding signal and the input signal (~~180 of Fig. 31~~); and coding means for generating a residual signal by driving a linear prediction inverse filter in response to the differential signal and for coding a component in correspondence with an arbitrary one of the

bands in the residual signal after subjecting the component to orthogonal transformation.

5. A speech and music signal coder ~~characterized in that in a speech and music signal coder~~ for generating a reproduction signal by driving a linear prediction synthesis filter calculated on the basis of an input signal in response to an excitation signal provided by adding 3 pieces of excitation signals in correspondence with 3 pieces of bands, said speech and music signal coder comprising: means for calculating a differential signal indicative of difference between a signal produced by adding a first and a second coded decoding signal and the input signal; and coding means for generating a residual signal by driving a linear prediction inverse filter calculated on the basis of the input signal by the differential signal and for coding a component in correspondence with an arbitrary band in the residual signal after orthogonal transformation of the component.

6. A speech and music signal coder for producing a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal which is provided by adding N pieces of excitation signals in correspondence with N (~~N designates a natural number of 2 or larger~~) pieces of bands, said speech and music signal coder comprising: differential signal calculating means for calculating a differential signal indicative of difference between a signal produced by adding a first through an (N-1)-th coded decoding signal and the input signal; and N-th coding means for generating a residual signal by driving an inverse filter of the linear prediction synthesis filter on the basis of the input signal in response the differential signal and for coding a component in correspondence with an arbitrary band in the residual signal after orthogonal transformation of the component.

7. The speech and music signal coder as claimed in claim 1, wherein: a pitch prediction filter is used in generating the excitation signal in correspondence with the first band of the input signal.

8. A speech and music signal coder comprising: second input signal generating means for generating a second input signal by down-sampling a first input signal sampled at a first sampling frequency to a second sampling frequency; first reproduction signal generating means for generating a first reproduction signal by driving a synthesis filter set with a first linear prediction coefficient calculated on the basis of the second input signal in response to an excitation signal; second reproduction signal generating means for generating a second reproduction signal by up-sampling the first reproduction signal to the first sampling frequency; third linear prediction coefficient calculating means for calculating a third linear prediction coefficient on the basis of a difference of the first linear prediction coefficient and a second linear prediction coefficient provided by converting a sampling frequency to the first sampling frequency; residual signal generating means for calculating a fourth linear prediction coefficient on the basis of a sum of the second linear prediction coefficient and the third linear prediction coefficient and for generating a residual signal by driving an inverse filter set with the fourth linear prediction coefficient on the basis of a differential signal indicative of difference between the first input signal and the second reproduction signal; and coding means for coding a component in correspondence with an arbitrary band in the residual signal after orthogonal transformation of the component.

9. A speech and music signal decoder for generating a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal provided by adding an excitation signal in correspondence with a first band and an excitation signal in

correspondence with a second band, said speech and music signal decoder comprising: excitation signal generating means for generating the excitation signal in correspondence with the second band by subjecting a decoding signal and an orthogonal transformation coefficient to orthogonal inverse transformation; second reproduction signal generating means for generating a second reproduction signal by driving the linear prediction synthesis filter in response to the excitation signal; first reproduction signal generating means for generating a first reproduction signal by driving the linear prediction filter in response to the excitation signal in correspondence with the first band; and speech and music decoded signal generating means for generating speech and music decoded signal by adding the first reproduction signal and the second reproduction signal.

10. A speech and music signal decoder for generating a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal provided by adding 3 pieces of excitation signals in correspondence with a first through a third band, said speech and music signal decoder comprising: first and second reproduction signal generating means for generating a first and a second reproduction signal by driving the linear prediction filter in response to the excitation signals in correspondence with the first and the second bands; third reproduction signal generating means for generating the excitation signal in correspondence with the third band by subjecting a decoded orthogonal transformation coefficient to orthogonal inverse transformation, and for generating a third reproduction signal by driving the linear prediction synthesis filter in response to the excitation signal; and speech and music decoded signal generating means for generating a speech and music decoded signal by adding the first through the third reproduction signals.

11. A speech and music signal decoder for generating a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal provided by adding N pieces of excitation signals in correspondence with first through an N-th band, said speech and music signal decoder comprising: N-th reproduction signal generating means for generating an excitation signal in correspondence with the N-th band by subjecting a decoded orthogonal transformation coefficient to orthogonal inverse transformation and for generating an N-th reproduction signal by driving the linear prediction synthesis filter in response to the excitation signal; first through (N-1)-th reproduction signal generating means for generating a first through an (N-1)-th reproduction signal by driving the linear prediction filter in response to the excitation signals in correspondence with the first through the (N-1)-th bands; and speech and music decoded signal generating means for generating a speech and music decoded signal by adding the first through the N-th reproduction signals.

12. A speech and music signal decoder for generating a reproduction signal for generating a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal provided by adding excitation signals in correspondence with a first and a second band, said speech and music signal decoder comprising: reproduction signal generating means for generating an excitation signal by subjecting a decoded orthogonal transformation coefficient to orthogonal inverse transformation and for generating a second reproduction signal by driving a linear prediction synthesis filter by the excitation signal; and speech and music decoded signal generating means for generating a speech and music decoded signal by adding the second reproduction signal and a first reproduction signal from first reproduction signal generating means.

13. A speech and music signal decoder for generating a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal provided by adding excitation signals in correspondence with a first through a third band, said speech and music signal decoder comprising: third reproduction signal generating means for generating the excitation signal by subjecting a decoded orthogonal transformation coefficient to orthogonal inverse transformation and for generating a third reproduction signal by driving the linear prediction synthesis filter in response to the excitation signal; and speech and music signal generating means for generating a speech and music signal by adding a first and a second reproduction signal respectively outputted from first and second reproduction signal generating means.

14. A speech and music signal decoder for generating a reproduction signal by driving a linear prediction synthesis filter in response to an excitation signal provided by adding N pieces of excitation signals in correspondence with a first through an N-th band; N-th reproduction signal generating means for generating the excitation signal by subjecting a decoded orthogonal transformation coefficient to orthogonal inverse transformation and for generating an N-th reproduction signal by driving the linear prediction synthesis filter in response to the excitation signal; and speech and music decoded signal generating means for generating a speech and music decoded signal by adding the N-th reproduction signal and a first through an (N-1)-th reproduction signal.

15. A speech and music signal decoder as claimed in claim 9, wherein a pitch prediction filter is used in generating the excitation signal in correspondence with the first band.

16. A speech and music signal decoder comprising: first reproduction signal generating means for up-sampling a signal provided

by driving a first linear prediction synthesis filter in response to a first excitation signal in correspondence with a first band to a first sampling frequency and for generating a reproduction signal; second reproduction signal generating means for generating a second excitation signal in correspondence with a second band by subjecting a decoded orthogonal transformation coefficient to orthogonal inverse transformation and for generating a second reproduction signal by driving a second linear prediction synthesis filter in response to the second excitation signal; and speech and music decoded signal generating means for generating a speech and music decoded signal by adding the first and the second reproduction signal.

17. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 1; and a speech and music signal decoder as claimed in claim 9; said decoder decoding a code outputted from said coder.

18. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 2; and a speech and music signal decoder as claimed in claim 10; said decoder decoding a code outputted from said coder.

19. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 3; and a speech and music signal decoder as claimed in claim 11; said decoder decoding a code outputted from said coder.

20. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 4; and a speech and music signal decoder as claimed in claim 12; said decoder decoding a code outputted from said coder.

21. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 5; and

a speech and music signal decoder as claimed in claim 13; said decoder decoding a code outputted from said coder.

22. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 6; and a speech and music signal decoder as claimed in claim 14; said decoder decoding a code outputted from said coder.

23. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 7; and a speech and music signal decoder as claimed in claim 15; said decoder decoding a code outputted from said coder.

24. A speech and music signal coding/decoding apparatus comprising: a speech and music signal coder as claimed in claim 8; and a speech and music signal decoder as claimed in claim 16; said decoder decoding a code outputted from said coder.